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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
KEANEY, ELIZABETH MARIE

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/811,980

Applicant(s)

HIROKADO, YOSHINOBU

Examiner

Elizabeth Keaney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-17 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/30/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims 13 and 15 are objected to because of the following informalities:

- The labels "d1" and "d2" have been used to describe two different values, the diameter of the holes in the insulating layers and the size of the polishing particles.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. (US Patent 5,229,331; hereinafter Doan) in view of Han et al. (US Patent 6,515,415; hereinafter Han).

Re claim 1: Doan discloses, in figures 1,6a and throughout the disclosure, a cold cathode light emitting device emitting light by electrons extracted from a cold cathode comprising:

- one layer of conductive material (12);
- a plurality of insulating layers (14,18) laminated on the layer of conductive material;
- a plurality of second electrodes (15) provided on the plurality of insulating layers to intersect the conductive material with the plurality of insulating layer interposed therebetween, for extracting electrons from the plurality of first electrodes; and
- a third electrode (ITO) opposed to the plurality of second electrodes for emitting light upon receipt of the electrons, with a voltage (20) for accelerating the electrons (17) being applied between the third electrode and the plurality of first electrodes, wherein

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- at least one hole is provided at intersections of the plurality of conductive layer and the plurality of second electrodes to extend through the plurality of second electrodes and the plurality of insulating layers to reach a surface of the plurality of first electrodes,
- the at least one hole has a first diameter d_1 at a position where the plurality of insulating layers are in contact with the plurality first electrodes and a second diameter d_2 at a position where the plurality of insulating layers are in contact with the plurality of second electrodes, where d_2 is greater than d_1 and
- a cone structure emitter tip (13) provided on the conductive layer in an opening portion having the first diameter d_1 in the at least one hole.

However, Doan fails to teach or fairly suggest the conductive layer being a plurality of electrodes and the emission tip in the form of a nano-fiber.

Han discloses, in figure 6 and throughout the disclosure, a plurality of cathode electrodes (12) within an FED device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Doan to have a plurality of cathodes because it improves the line addressing capability thereby improving the image display capability while reducing the power consumption of the device.

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Han further discloses substituting nano-fibers for cone shaped emitter tips (column 2, lines 5-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute nano-fibers for the cone shaped emitter tips of Doan because they offer more uniform electron emission without reducing the power consumption of the device.

Re claim 2: Doan discloses, in figure 6A and throughout the disclosure, the hole is divided into a first section corresponding to a lowermost insulating layer (18) being in contact with the plurality of first electrodes, a second section (14) corresponding to the remainder of the plurality of insulating layers located over the lowermost insulating layer and a third section corresponding to the plurality of second electrodes (15), the hole has a diameter d_1 in the first section, the diameter d_2 at an upper part of the second section, and a third diameter d_m at a lower part of the second section, where d_m is greater than d_2 .

Re claim 3: Doan discloses, in figure 6B and throughout the disclosure, the hole is divided into a first section corresponding to a lowermost insulating layer (18) of the plurality of insulating layers being in contact with the plurality of first electrodes, a second section (14) corresponding to the remainder of the plurality of insulating layers located over the lowermost insulating layer and a third section corresponding to the plurality of second electrodes (15), the hole having a first diameter d_1 in the first section

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and a diameter in the second section which decreases to taper toward the plurality of second electrodes.

Re claims 4 and 6: Doan and Han teach all the limitations as shown above.

However, they fail to teach or fairly suggest the hole having a first diameter d_1 in the first section and a constant diameter substantially equal to the second diameter d_2 throughout the second section and an insulating layer located over a lowermost insulating layer of the plurality of insulating layers being in contact with the plurality of first electrodes having the same pattern configuration as the plurality of second electrodes.

One of ordinary skill in the art would recognize that the tapering formed in the insulating layers of Doan is due to the choice of etching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a more precise mask during the etching step to produce a hole having a uniform diameter, which would thereby produce an insulating layer having the same pattern as the second electrode because it improves the focus of the electron emissions.

Re claim 5: Doan discloses, in figure 6B and throughout the disclosure, the hole is divided into a first section corresponding to a lowermost insulating layer (18) of the plurality of insulating layers being in contact with the plurality of first electrodes, a second section (14) corresponding to the remainder of the plurality of insulating layers

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located over the lowermost insulating layer and a third section corresponding to the plurality of second electrodes (15), the hole having a first diameter d_1 in the first section and a diameter in the second section which increases to flare toward the plurality of second electrodes.

Re claim 7: Doan discloses, in figure 6A and throughout the disclosure, a lowermost insulating layer (18) of the plurality of insulating layers (14,18) being in contact with the plurality of first electrodes (12).

The Examiner notes that the limitation "deposited...deposited" is drawn to a product by process limitation. While the Examiner has addressed the implied structure produced by the process, the lower most insulating layer, the process limitation is afforded no patentable weight. See MPEP 2113.

Re claim 8: Doan discloses, in figure 6A and throughout the disclosure, a lowermost insulating layer (18) of the plurality of insulating layers being in contact with the plurality of first electrodes (12).

The Examiner notes that the limitation "formed by....therein" is drawn to a product by process limitation. While the Examiner has addressed the implied structure produced by the process, the lower most insulating layer, the process limitation is afforded no patentable weight. See MPEP 2113.

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Re claim 9: Doan discloses, in figures 6A and 6B and throughout the disclosure, a lowermost insulating layer (18) with the plurality of first electrodes (12) has a thickness t_1 , and the remainder of the plurality of insulating layers other than the lowermost insulating layer (14) has a thickness t_2 , where t_1 is smaller than t_2 .

Re claim 11: Doan discloses an image display device comprising a display provided with the cold cathode light emitting device as recited in claim 1 (column 1, line 23).

Re claims 12 and 13: Doan and Han disclose a nano-fiber structure.

The Examiner notes that the limitations "coating..." and "spraying..." are drawn to product by process limitations. While the Examiner has addressed the implied structure produced by the process, the nano-fiber structures, the process limitation is afforded no patentable weight. See MPEP 2113.

Re claims 14-17: The Examiner notes that the limitations "forming...", "selectively removing...", "coating..." and "planarizing..." are drawn to product by process limitations. While the Examiner has addressed the implied structure produced by the process, a plurality of first and second electrodes, a plurality of insulating layers and nanofiber-structures, the process limitation is afforded no patentable weight. See MPEP 2113.

Allowable Subject Matter

Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The best prior art discloses a cold cathode light emitting device comprising a plurality of first and second electrodes, and a plurality of insulating layers. However, the prior art fails to teach or fairly suggest a cold cathode light emitting device wherein the plurality of insulating layers are each formed by firing a paste material made of resin containing glass powder dispersed therein, and a softening point of the glass powder used for the plurality of insulating layers decreases in the order of getting closer to the plurality of second electrodes, as claimed in claim 10.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patents 6,369,496 and 5,683,282 disclose the current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-

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2489. The examiner can normally be reached on Monday, Tuesday, Thursday, Friday 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth Keaney
Examiner
Art Unit 2882



EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER